LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

What is claimed is:

1. (original) A method for detecting the presence of nucleic acids in a sample, said method comprising:

   (a) exposing uncomplexed neutral capture probes to a sample possibly containing complementary nucleic acid targets, thereby generating a mixture;

   (b) submitting said mixture to hybridization conditions which provide for said nucleic acids targets to bind specifically to complementary neutral capture probes, thereby generating negatively charged capture probe-nucleic acid target hybrids;

   (c) submitting said negatively charged hybrids to positively charged reporters selected from the group consisting of transition metal atoms, molecules, and macromolecules being capable of electrostatically binding to said hybrids, thereby generating higher-order complexes; and

   (d) detecting said higher-order complexes.

2. (original) A method according to claim 1, wherein said nucleic acids targets are unlabeled.

3. (withdrawn) A method according to claim 1, wherein said capture probes are immobilized on a support surface.

4. (withdrawn) A method according to claim 3; wherein said support surface is selected from the group consisting of a glass surface, a silicon surface, a gold surface, an

electrode surface, a particle surface, a gel matrix, a membrane surface, a paper surface and a plastic surface.

5. (withdrawn) A method according to claim 3, wherein said support surface comprises a solid support surface.

6. (withdrawn) A method according to claim 5, wherein said solid support surface comprises a probe array.

7. (withdrawn) A method according to claim 3, wherein said neutral capture probes are chemically modified to incorporate a functional group providing for said probes to covalently link to said surface.

8. (withdrawn) A method according to claim 7, wherein said functional group is selected from the group consisting of amine, aldehyde, thiol, epoxy and carboxyl moieties.

9. (withdrawn) A method according to claim 3, wherein said support surface is coated with a passivation agent preventing non-specific binding of nucleic acid targets.

10. (withdrawn) A method according to claim 9, wherein said passivation agent is selected from the group consisting of polyvinylpyrollidone, polyethylene glycol, and BSA

11. (withdrawn) A method according to claim 3, wherein said support surface is chemically modified, to facilitate coupling and chemical bonding of said neutral probe to said support surface.

12. (withdrawn) A method according to claim 11, wherein said support surface is chemically modified to yield functional groups selected from the group consisting of an aldehyde, an aminoalkylsilane activated with carbonyldiimidazole, thiol, epoxy and carboxyl moieties.

13. (withdrawn) A method according to claim 1, wherein said neutral capture probes are selected from the group consisting of peptide nucleic acids (PNA) and methylphosphonate.

14. (withdrawn) A method according to claim 1, wherein said nucleic acid targets comprise DNA or RNA molecules.

15. (withdrawn) A method according to claim 1, wherein said nucleic acid targets are generated by methods selected from the group consisting of polymerase chain reaction (PCR), reverse transcriptase-PCR (RT-PCR), strand displacement amplification (SDA), ligase chain reaction (LCR), transcription-associated amplification, nucleic acid sequence-based amplification (NASBA), whole genome amplification (WGA), helicase-dependent isothermal amplification, and chemical synthesis.

16. (original) A method according to claim 1, further comprising a washing step after step (c).

17. (withdrawn) A method according to claim 1, wherein said reporters serve as transducers.

18. (withdrawn) A method according to claim 1, wherein said reporters exhibit low affinity for uncharged probes.

19. (withdrawn) A method according to claim 1, wherein said reporters are capable of electrostatically binding to the phosphate backbone of said hybrids.

20. (withdrawn) A method according to claim 1, wherein said transition metal atoms are selected from the group consisting of Ag.sup.+ and Cd.sup.++.

21. (withdrawn) A method according to claim 1, wherein said transition metal atoms comprise ions that can be chemically modified to yield higher-order complexes using bound nucleic acids as a scaffold.

22. (withdrawn) A method according to claim 1, wherein said detection includes a chemical reaction step rendering said transition metal atoms detectable.

23. (withdrawn) A method according to claim 1, wherein said reporters comprise polythiophenes.

24. (withdrawn) A method according to claim 23, wherein said polythiophenes are water soluble and cationic.

25. (withdrawn) A method according to claim 1, wherein said reporters comprise enzymes.

26. (withdrawn) A method according to claim 25, wherein said enzymes comprise alkaline phosphatase having polystyrene beads conjugated thereto.

27. (withdrawn) A method according to claim 1, wherein said detection is selected from the group consisting of optical detection, fluorometric detection, colorimetric detection, electrochemical detection, chemiluminescent detection, microscopy and spectrophotometric detection.

28. (original) A method for detecting the presence of nucleic acids in a sample, said method comprising:

(a) exposing uncomplexed neutral capture probes to a sample possibly containing complementary nucleic acid targets and containing positively charged reporters selected from group consisting of transition metal atoms, molecules and macromolecules, thereby generating a mixture;

(b) submitting said mixture to hybridization conditions which provide for said nucleic acids targets to bind specifically to complementary neutral capture probes, thereby generating negatively charged capture probe-nucleic acid target hybrids, said reporters being capable of electrostatically binding to said hybrids, thereby generating higher-order complexes; and

(c) detecting said higher-order complexes.

29. (previously presented) A method according to claim 28, wherein said nucleic acids targets are unlabeled.

30. (withdrawn) A method according to claim 1, wherein said capture probes are immobilized on a support surface.

31. (withdrawn) A method according to claim 30, wherein said support surface is selected from the group consisting of a glass surface, a silicon surface, a gold surface, an electrode surface, a particle surface, a gel matrix, a membrane surface, a paper surface and a plastic surface.

32. (withdrawn) A method according to claim 30, wherein said support surface comprises a solid support surface.

33. (withdrawn) A method according to claim 32, wherein said solid support surface comprises a probe array.

34. (withdrawn) A method according to claim 30, wherein said neutral capture probes are chemically modified to incorporate a functional group providing for said probes to covalently link to said support surface.

35. (withdrawn) A method according to claim 34, wherein said functional group is selected from the group consisting of amine, aldehyde, thiol, epoxy and carboxyl moieties.

36. (withdrawn) A method according to claim 30, wherein said support surface is coated with a passivation agent preventing non-specific binding of nucleic acid targets.

37. (withdrawn) A method according to claim 36, wherein said passivation agent is selected from the group consisting of polyvinylpyrollidone, polyethylene glycol, and BSA.

38. (withdrawn) A method according to claim 30, wherein said support surface is chemically modified, to facilitate coupling and chemical bonding of said neutral probe to said support surface.

39. (withdrawn) A method according to claim 38, wherein said support surface is chemically modified to contain functional groups selected from the group consisting of

an aldehyde, an aminoalkylsilane activated with carbonyldiimidazole, thiol, epoxy and carboxyl moieties.

40. (withdrawn) A method according to claim 28, wherein said neutral capture probes are selected from the group consisting of peptide nucleic acids (PNA), and methylphosphonate.

41. (withdrawn) A method according to claim 28, wherein said nucleic acid targets are selected from the group consisting of DNA and RNA molecules.

42. (withdrawn) A method according to claim 28, wherein said nucleic acid targets are generated by methods selected from the group consisting of polymerase chain reaction (PCR), reverse transcriptase-PCR (RT-PCR), strand displacement amplification (SDA), ligase chain reaction (LCR), transcription-associated amplification, nucleic acid sequence-based amplification (NASBA), whole genome amplification (WGA), helicase-dependent isothermal amplification, and chemical synthesis.

43. (original) A method according to claim 28, further comprising a washing step after step (b).

44. (withdrawn) A method according to claim 28, wherein said reporters exhibit low affinity for uncharged probes.

45. (withdrawn) A method according to claim 28, wherein said reporters are capable of electrostatically binding to the phosphate backbone of said hybrids.

46. (withdrawn) A method according to claim 28, wherein said transition metal atoms are selected from the group consisting of Ag.sup.+ and Cd.sup.++.

47. (withdrawn) A method according to claim 28, wherein said transition metal atoms comprise ions that can be chemically modified to yield higher-order complexes using bound nucleic acids as a scaffold.

48. (withdrawn) A method according to claim 28, wherein said detection includes a chemical reaction step rendering said transition metal cations detectable.

49. (withdrawn) A method according to claim 28, wherein said reporters comprise polythiophenes.

50. (withdrawn) A method according to claim 49, wherein said polythiophenes are water-soluble and cationic.

51. (withdrawn) A method according to claim 28, wherein said reporters comprise enzymes.

52. (withdrawn) A method according to claim 51, wherein said enzymes comprise alkaline phosphatase having polystyrene beads conjugated thereto.

53. (withdrawn) A method according to claim 28, wherein said detection is selected from the group consisting of optical detection, fluorometric detection, colorimetric detection, electrochemical detection, chemiluminescent detection microscopy and spectrophotometric detection.

54. (withdrawn) A kit for detecting the presence of nucleic acids in a sample, said kit comprising: uncomplexed neutral capture probes; a control sample possibly containing nucleic acid targets that are complementary to the neutral capture probes; and one or more positively charged reporters selected from the group consisting of transition

metal cations, molecules or macromolecules; said reporters being capable of electrostatically binding to negatively charged capture probe-nucleic acid target hybrids.

55. (withdrawn) A kit according to claim 54, wherein said neutral capture probes are selected from the group consisting of peptide nucleic acids (PNA) and methylphosphonate.

56. (withdrawn) A kit according to claim 54, wherein said capture probes are immobilized on a support surface.

57. (withdrawn) A kit according to claim 56, wherein said support surface is selected from the group consisting of a glass surface, a silicon surface, a gold surface, an electrode surface, a particle surface, a gel matrix, a membrane surface, a paper surface and a plastic surface.

58. (withdrawn) A kit according to claim 56, wherein said support surface comprises a solid support surface.

59. (withdrawn) A kit according to claim 58, wherein said solid support surface comprises a probe array.